

# **Availability of Domestic Natural Gas to Serve California's Needs and Role of LNG**

## **20<sup>th</sup> Annual Environmental Law Super Symposium**

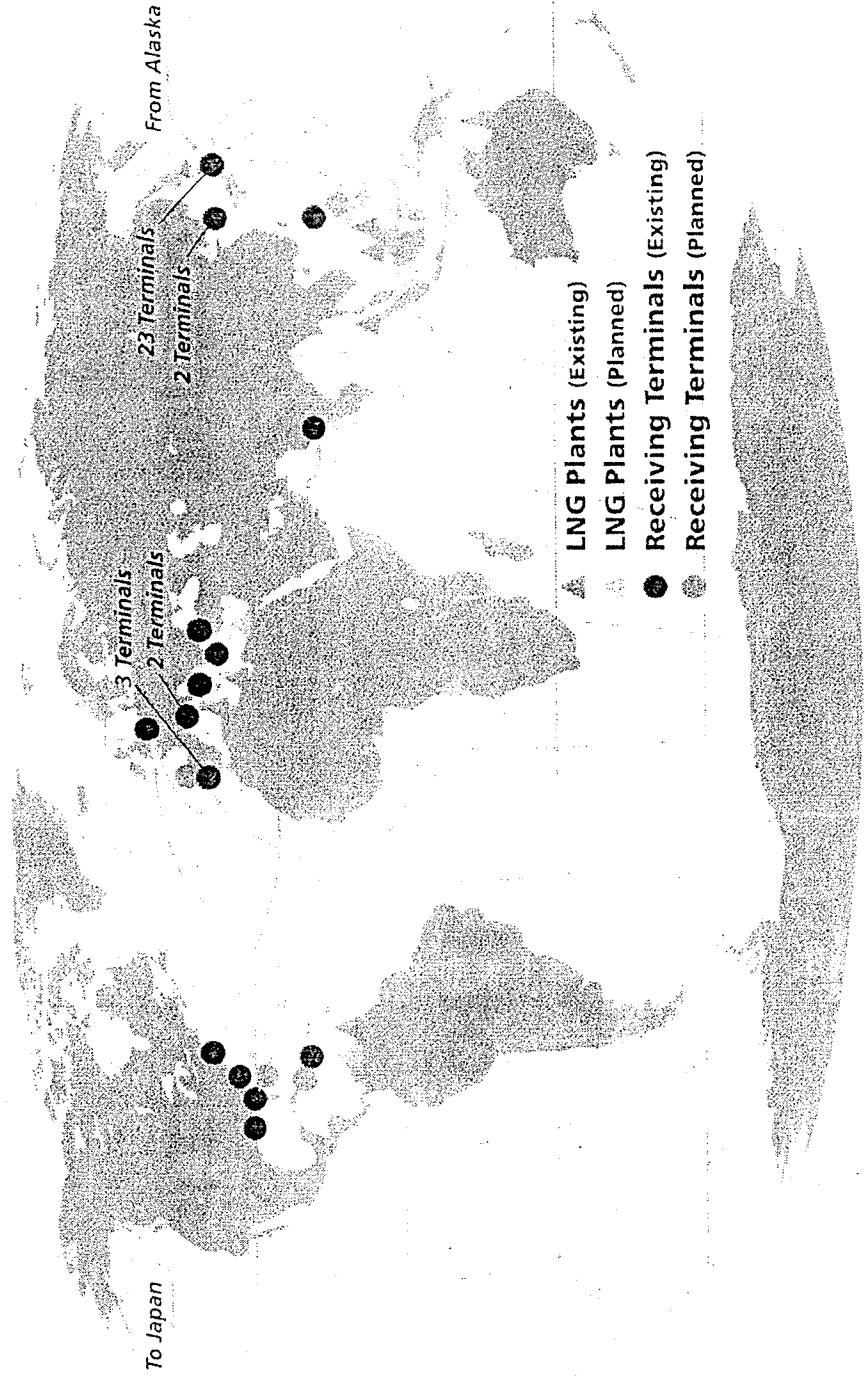
April 6, 2006

Bill Powers, P.E.

Border Power Plant Working Group

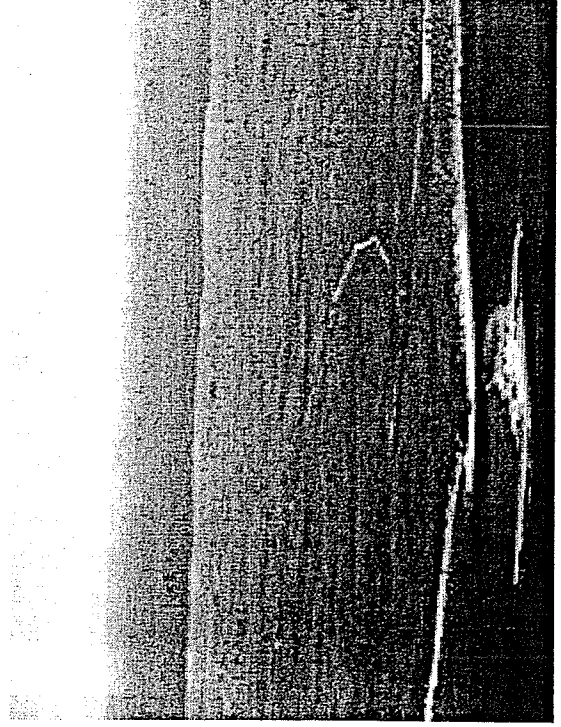
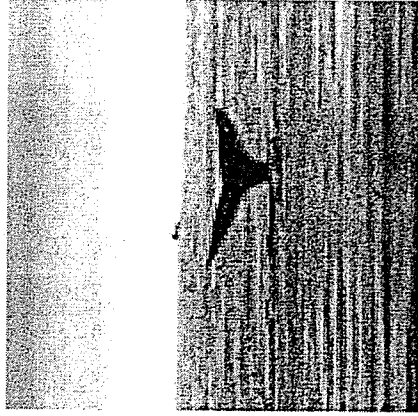
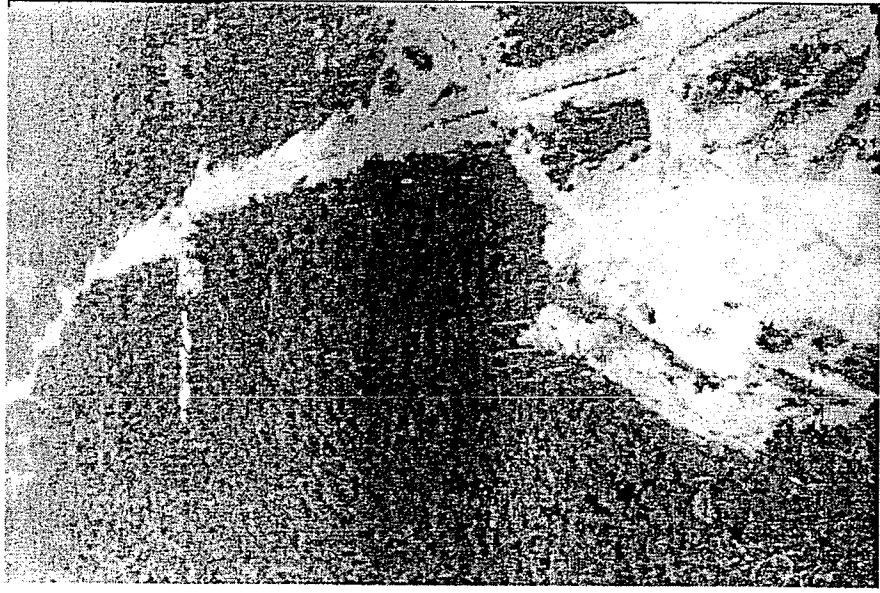
[www.borderpowerplants.org](http://www.borderpowerplants.org)

# Worldwide view of LNG supply chains

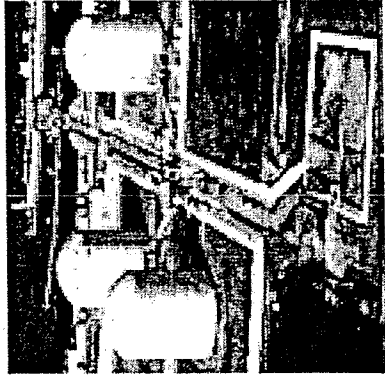
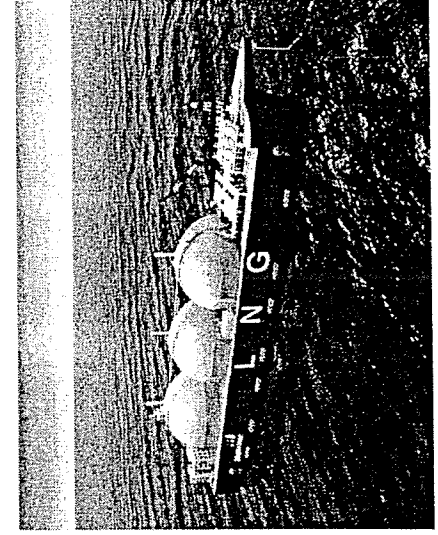
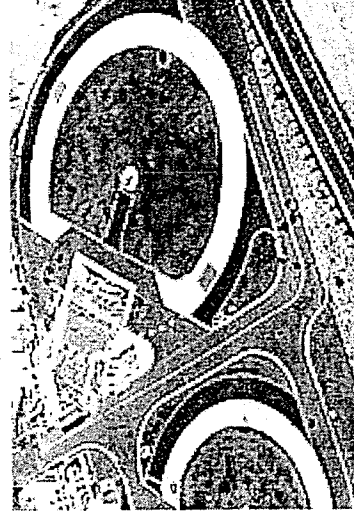
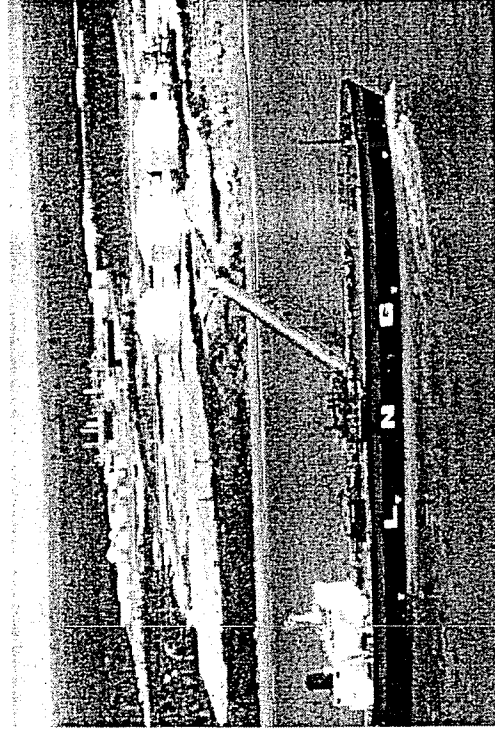
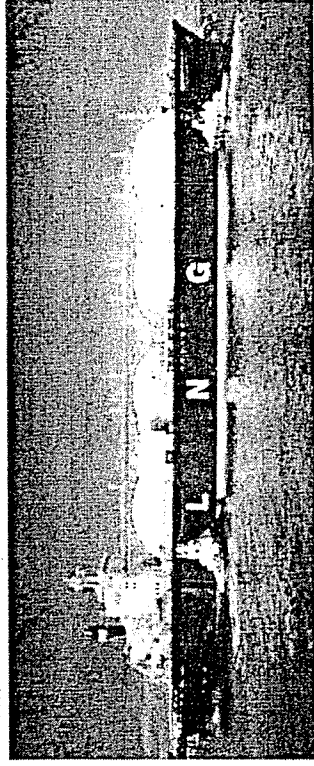


# Where is gas coming from to make LNG for California?

Clockwise from left: Camisea pipeline, Peru; offshore Sakhalin, Russia; Bintuni Bay, West Papua, Indonesia; Barrow Island, Australia



# LNG liquefaction, tanker and receiving operations



# **LNG versus Natural Gas: Supply, Demand, and Price**

# U.S. & California natural gas 101

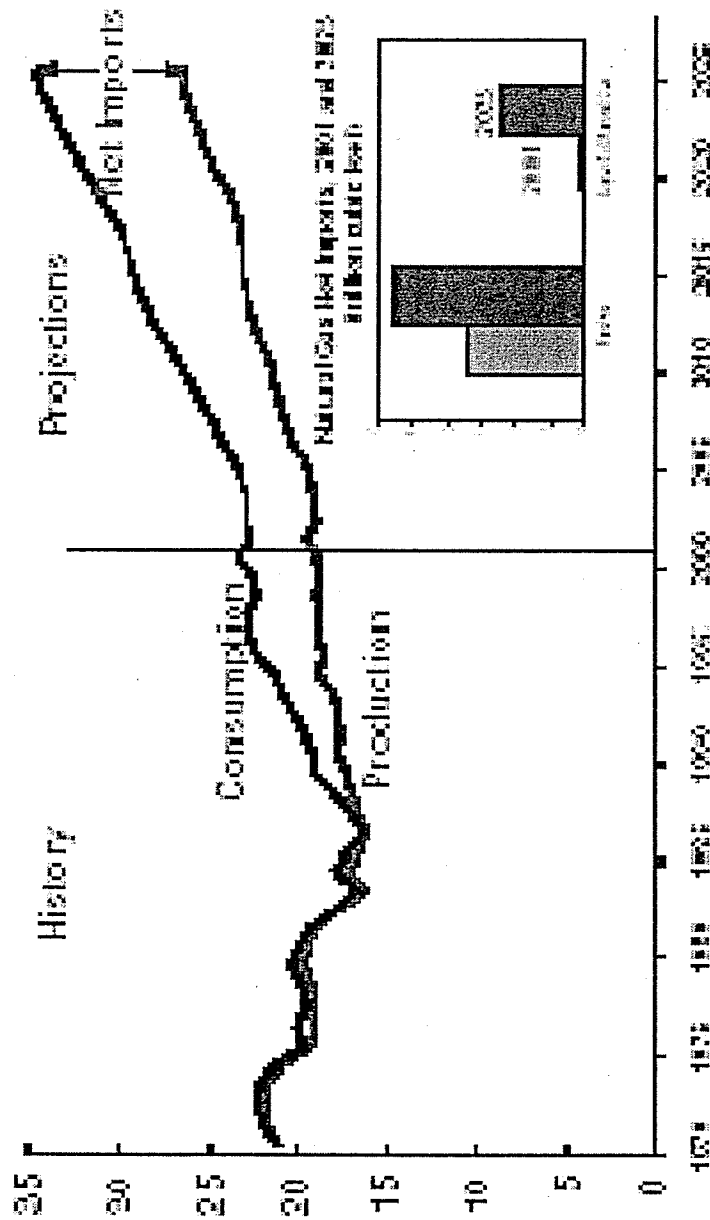
bcfd = billion cubic feet per day, tcf = trillion cubic feet

U.S. natural gas usage rate	60 bcfd [22 tcf/year]
DOE EIA estimate of U.S. reserves, excluding Alaska	1,400 tcf [60-year supply]
California daily usage rate	5.5 bcfd
Utility core customer usage	1.5 – 2 bcfd
Utility non-core customer usage (powerplants, industrial)	4 – 4.5 bcfd
Capacity of one LNG terminal	1 bcfd
Baja California usage rate	0.1 bcfd

# DOE says U.S. domestic natural gas production will rise, along with Canadian production, though may not keep pace with demand

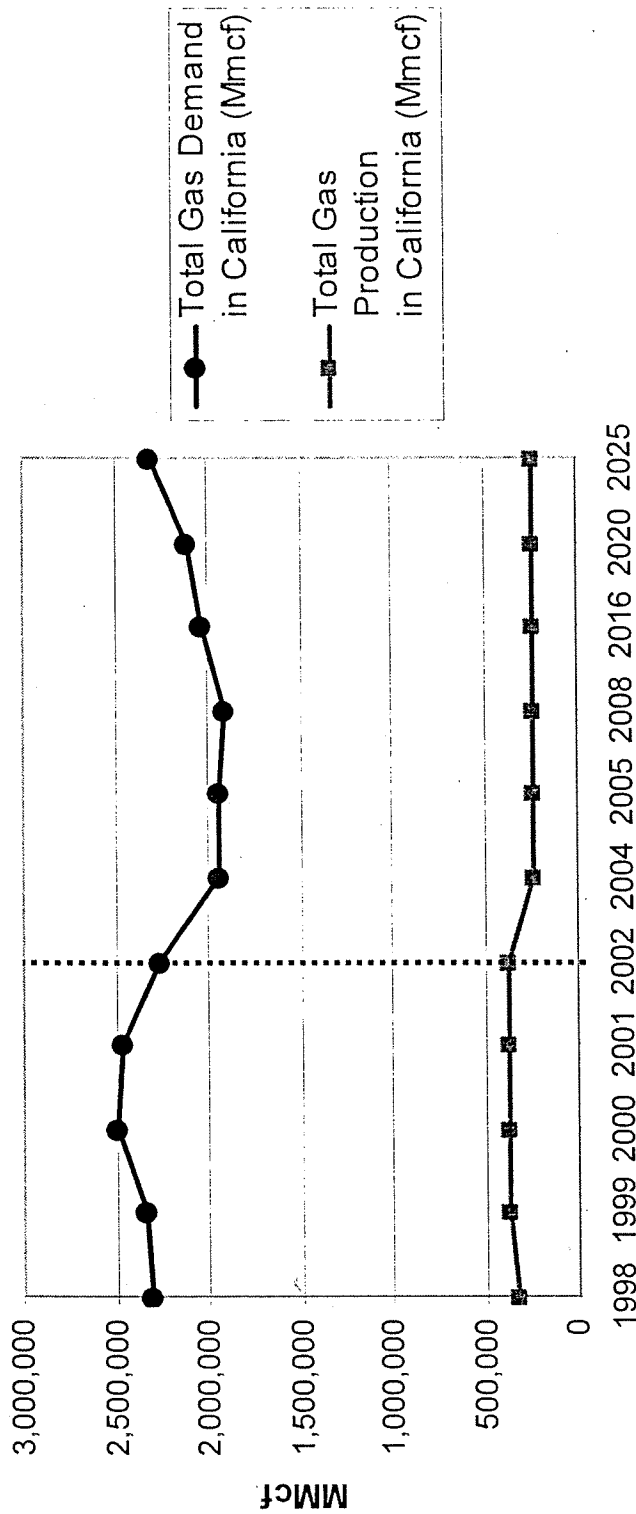
From: James Kendell, DOE EIA, *Current Natural Gas and LNG Projections*, National Association of Regulatory Utility Commissioners, July 29, 2003

Natural Gas Production, Consumption, and Imports,  
1970 - 2025 (trillion cubic feet)



# 20% decline in natural gas demand in California since 2001

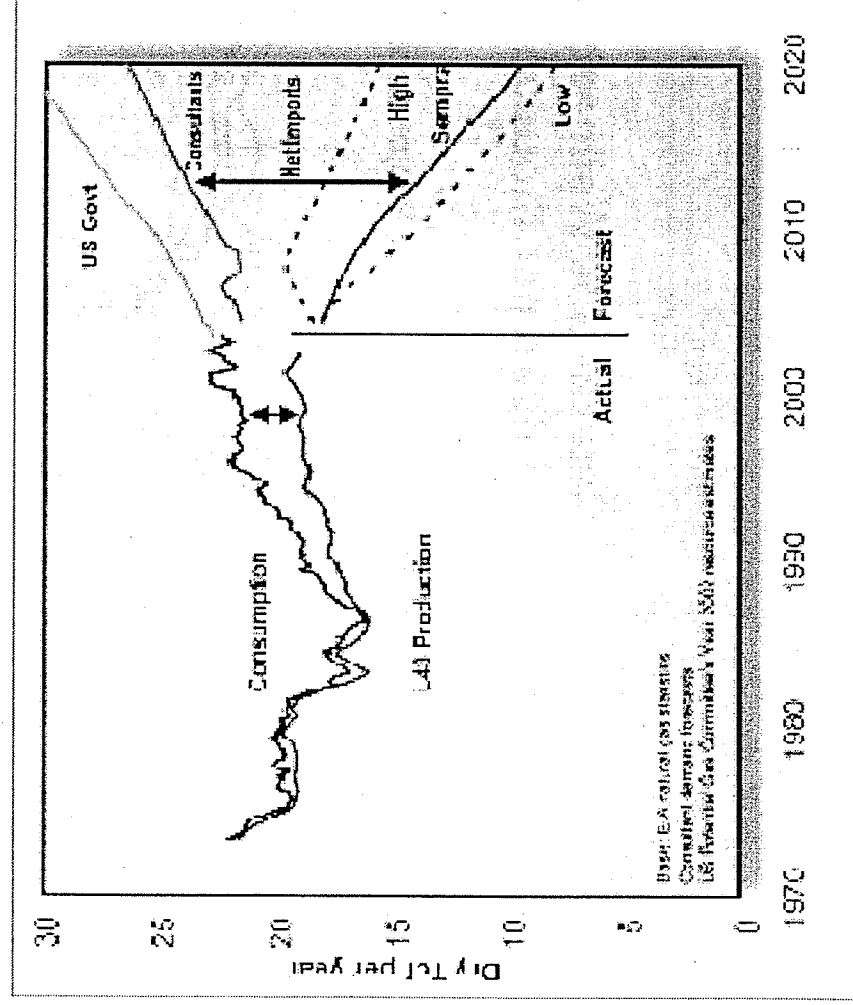
from: CEC presentation, D. Maul, Long Beach LNG Forum, April 2, 2005





# Sempra “doomsday” scenario – crisis in domestic production.

From: presentation by Greg Bartholomew, VP Gas Strategies, Sempra LNG, CPUC/CEC natural gas 2006-2016 workshop, December 10, 2003, San Francisco.



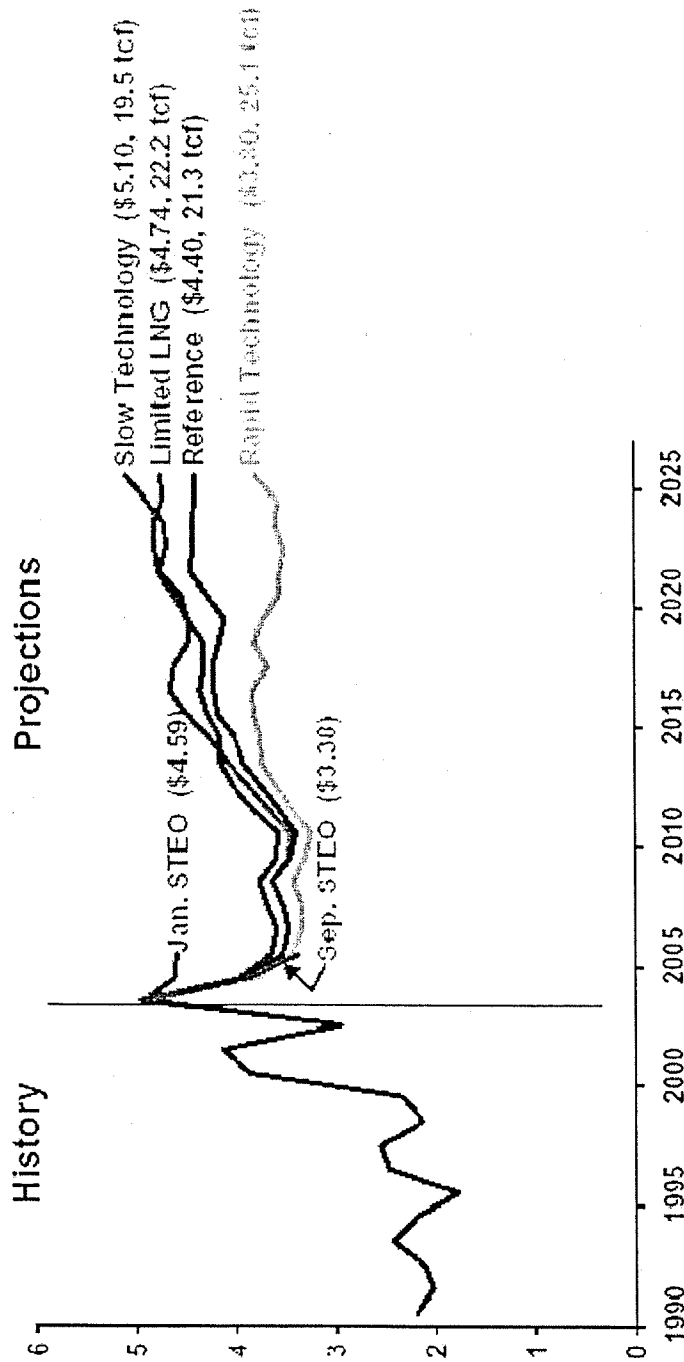
**“California has little choice but to allow the development of LNG terminals”**

**“The only decision is where and how”**

# March 2004 DOE projection: domestic gas price in \$3.80/MMBtu - \$4.40/MMBtu range in 2025

From: Dana Van Wagoner, DOE EIA, Domestic Natural Gas Supply: A Large Resource Base Does Not Guarantee Low Long-Term Prices, NEMS/AEO Conference, March 23, 2004

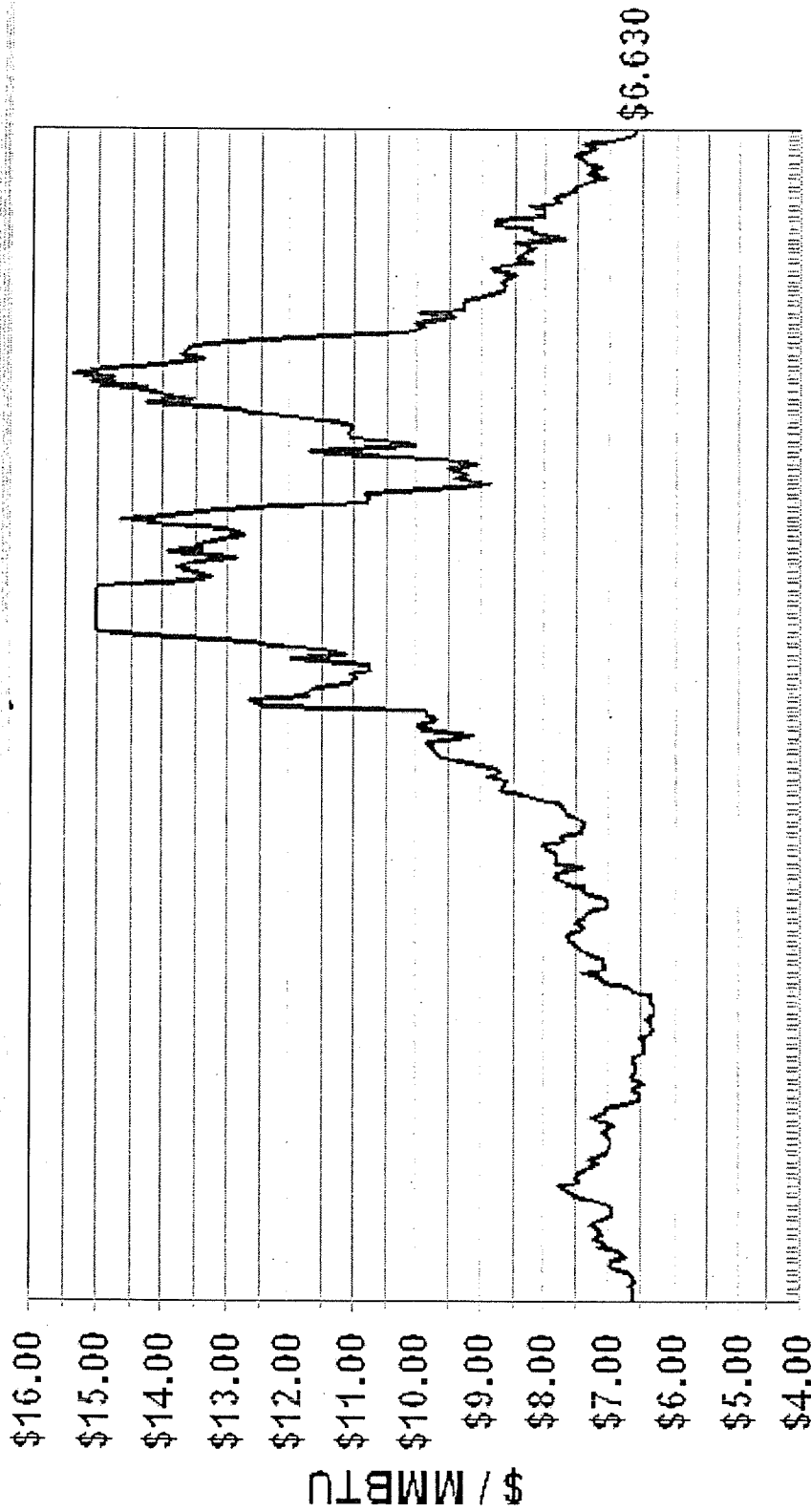
## Natural Gas Wellhead Prices (2002 dollars per thousand cubic feet)



Values in parentheses = (average lower 48 wellhead price, lower 48 production)



# Natural gas spot market price trend, March 2005 - March 2006



03/01/2005 04/29/2005 06/29/2005 08/29/2005 10/27/2005 12/30/2005  
03/31/2005 05/31/2005 07/29/2005 09/28/2005 11/30/2005 02/01/2006

Mar 1, 2005 - Mar 1, 2006

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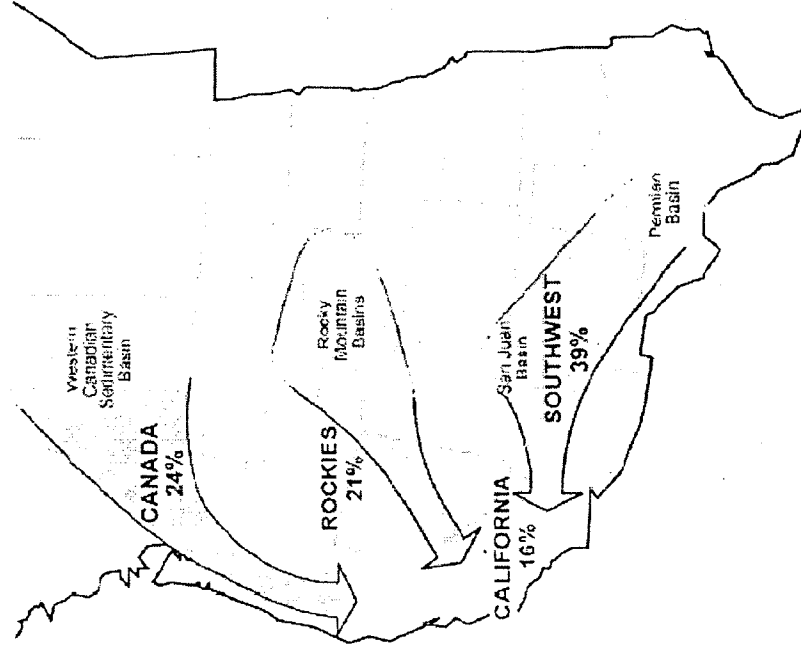
# California's current natural gas supplies and cost vs. LNG

from: (map) CEC, Natural Gas Assessment Update, Feb. 2005, p. 13, (cost per supply basin) CERA, 2004

DOE states 60+ year (~1,400 Tcf) potential reserves in lower 48 at current 20 Tcf/yr national usage rate.<sup>a</sup>

Cost of production:

- Southwest: \$2.70/MMBtu
- Rockies: \$2.20/MMBtu
- Canada: \$3.20/MMBtu
- LNG import cost: ~\$5/MMBtu<sup>b</sup>



Ref (a): DOE, *Natural Gas Fundamentals* ~ from *Resource to Market*, June 2003, DOE/FE-0457, p. 4.

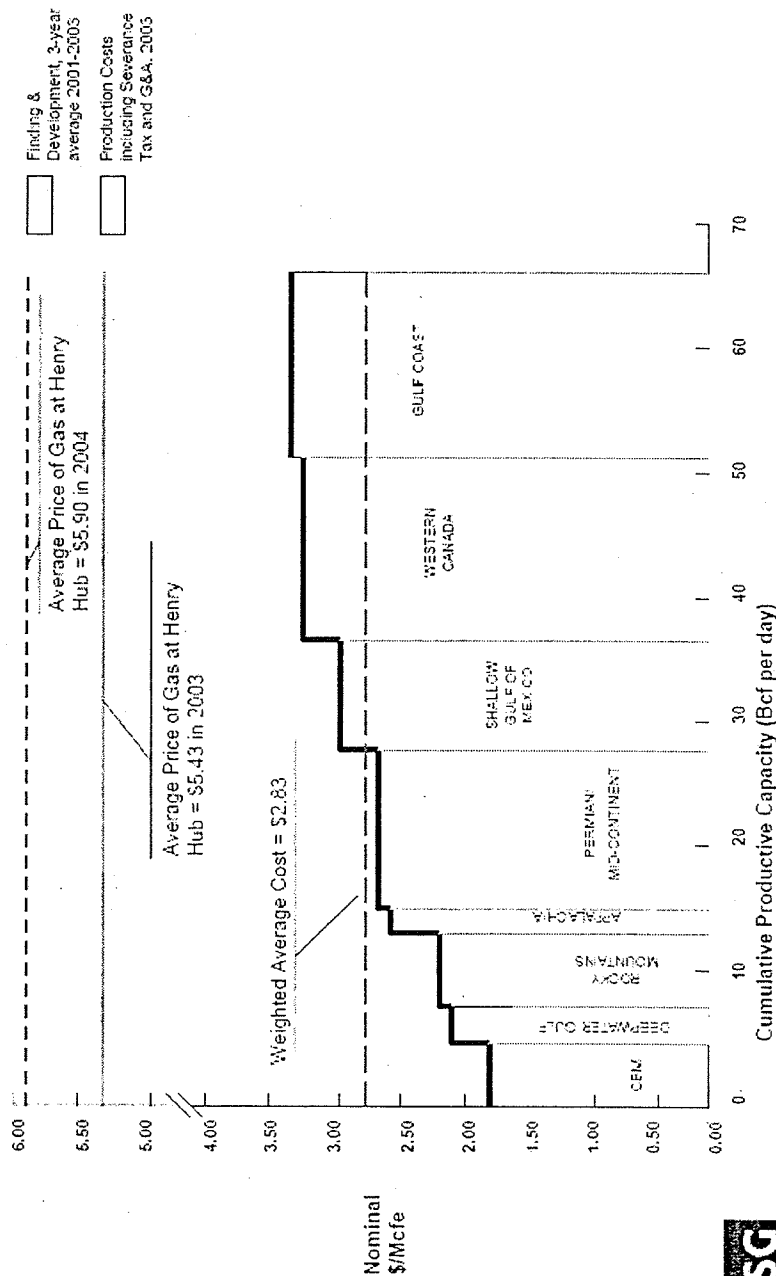
Ref (b): Gas Utility Week, SNL Energy, Feb. 20, 2006, p. 25.

# Average cost of U.S. natural gas production under \$3/MMBtu



NORTH AMERICAN NATURAL GAS MARKET

## NATURAL GAS RESOURCE COSTS 2002-2003



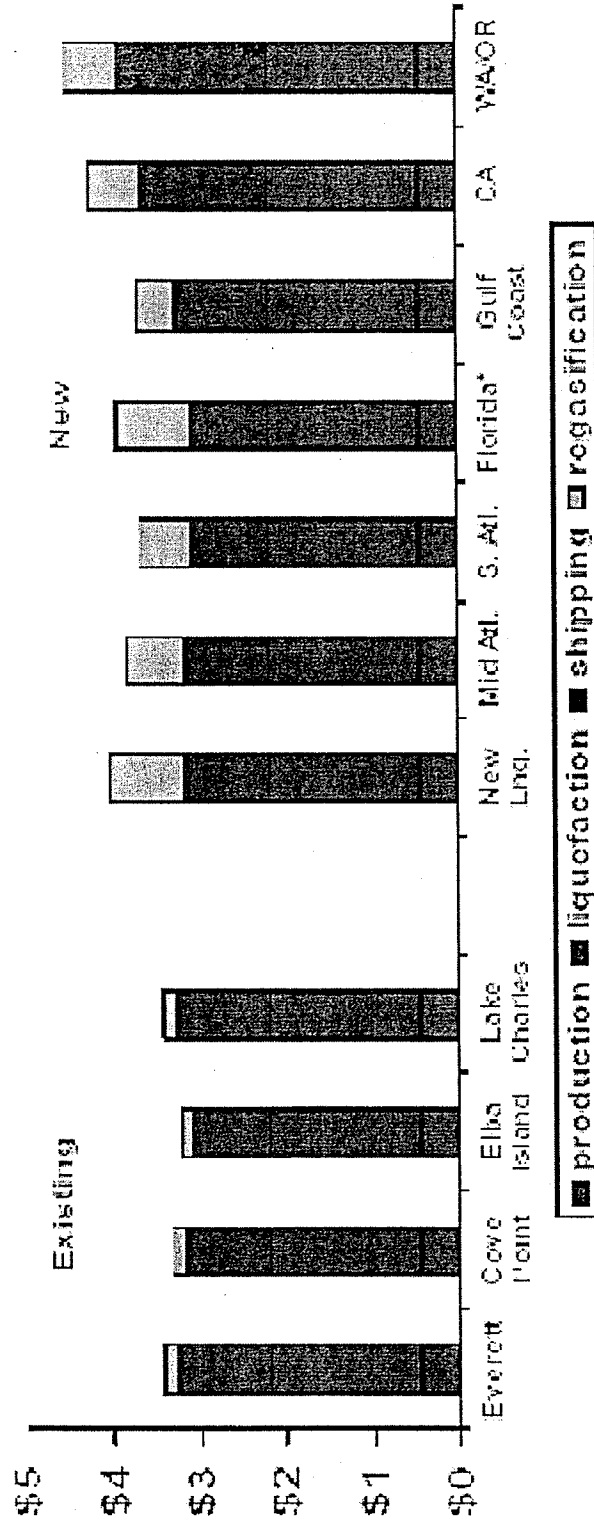
SEVERANCE & INVESTMENT BANK INC.

Source: CERA, Nov 2004; SG

# California LNG at ~\$4.50/MMBtu, ability to compete in doubt in rational natural gas market

From: James Kendell, DOE EIA, *Current Natural Gas and LNG Projections*, National Association of Regulatory Utility Commissioners, July 29, 2003

**Minimum Regional LNG Costs  
(2001 dollars per thousand cubic feet)**



\* Regasification includes pipeline cost from Bahamas



# **Price Manipulation in Domestic Natural Gas Markets and Artificial LNG Markets**

# **March 2006 - Midwest AG report on natural gas price manipulation**

*The Role of Supply, Demand, and Financial Commodity Markets in the Natural Gas Price Spiral – III, IA, MO, WI AGs*

Demand has not been “surging,” “soaring” or “skyrocketing.”

Over past 10 years demand has been relatively flat.

Over the past 3 years, demand has declined slightly.

Natural gas markets are subject to far less regulation than most other commodities.

Natural gas markets lack transparency and are vulnerable to abuse and manipulation.

Natural gas prices are far higher than they should be.



# April 2005 - legislation to “rein in” natural gas traders

Bipartisan federal legislation introduced to "*bring some stability, predictability and reliability*" back to natural gas markets.

Underscores that recent gas price spikes are a result of increased speculative trading.

Imposes new price limits on natural gas futures trading.

Blames recent price spikes in large part on implementation of the Commodity Futures Modernization Act of 2000 which "*altered the fundamental trading rules for natural gas allowing for greater speculation by an already limited number of traders.*"

California missing-in-action in push for legislative remedy to natural gas market gaming.

# **Solution to LNG price risk in gas-on-gas competition? Shell makes case for core contracts at CEC/CPUC workshop, 12/03**

Baja  
California  
LNG

What is Needed in California

## **2. Timing is critical**

- Ongoing open season process on BNP, TGN and GBN pipelines
  - ✓ Firm commitments by September 1, 2004
- Financial commitments must be made by LNG sponsors in 2004 to meet construction goals
- Expiration of El Paso and Transwestern pipeline contracts
  - ✓ LNG can be an alternative to long-term pipeline commitments
- ✓ LNG must be a tangible, feasible alternative at the time SoCal Gas makes its decisions on interstate pipeline contract renewal



Shell Gas & Power

# **CPUC complies - invitation to ratepayer exposure + affiliate transaction conflicts**

- March 2004, responses of Transwestern and El Paso, the pipeline companies that would be displaced, to CPUC proposal to allow substitution of LNG supplies for domestic natural gas firm capacity;

- El Paso: *"If utilities decline to hold EPNG capacity now, it may be unavailable to California in the future."*
- Transwestern: *"Important that utilities not sacrifice long-term supply reliability in the pursuit of supply diversity."*

- Sept 2004, CPUC authorizes SoCalGas Co. to displace 1,100 mmcf of firm natural gas pipeline capacity, the equivalent throughput of 1½ LNG terminals, with LNG supplies;

- Aug 2005, lawsuit filed over CPUC decision - lack of evidentiary process.

- Feb 2006, CPUC President Peevey to CA senate committee:

*"CPUC note equipped to do natural gas needs analysis."*<sup>a</sup>

Ref (a): California Energy Circuit, Legislators Comb Regulatory Energy Plans, Feb. 24, 2006, p. 8.

# Sempra/Shell/BP Baja LNG project

1 bcf/d at startup, expansion to 2 bcf/d planned

source: Institute of Americas LNG 2005

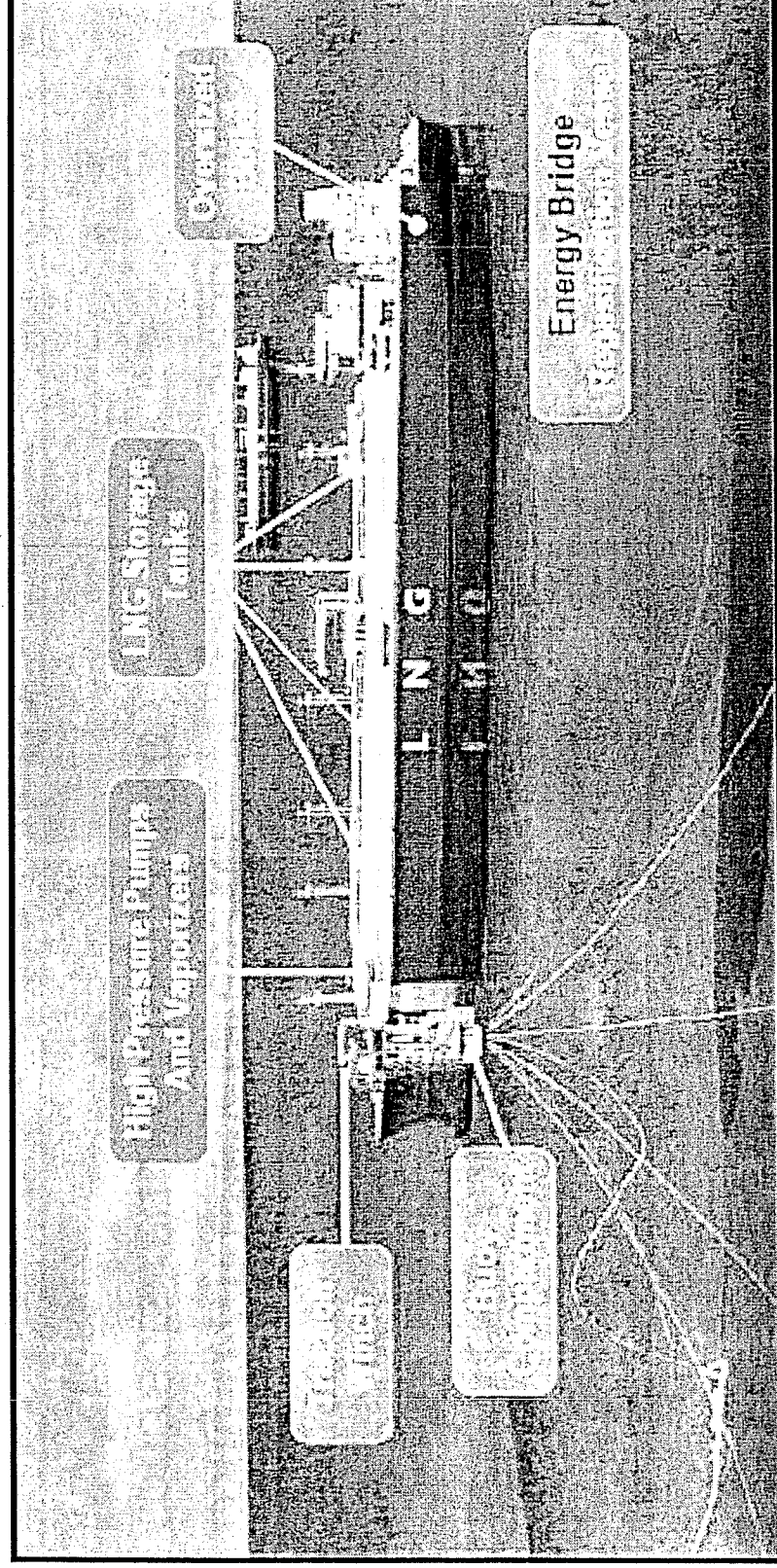


# Current California approach locks ratepayers into taking the risk

Current California model (aka Japanese model)	East Coast model
\$5 billion LNG supply chain, no spot cargos.	Spot cargos, <\$250 million to get started.
Long-term utility ratepayer contracts required to convince investors.	LNG shipper takes all risk.
LNG substitutes for domestic gas long-term, no competition. "Supply diversity" premium for LNG.	gas-on-gas competition w/domestic gas provides price relief.

# Newest U.S. LNG terminal – March 2005 offshore, spot cargos delivered upstream of Henry Hub gas processing

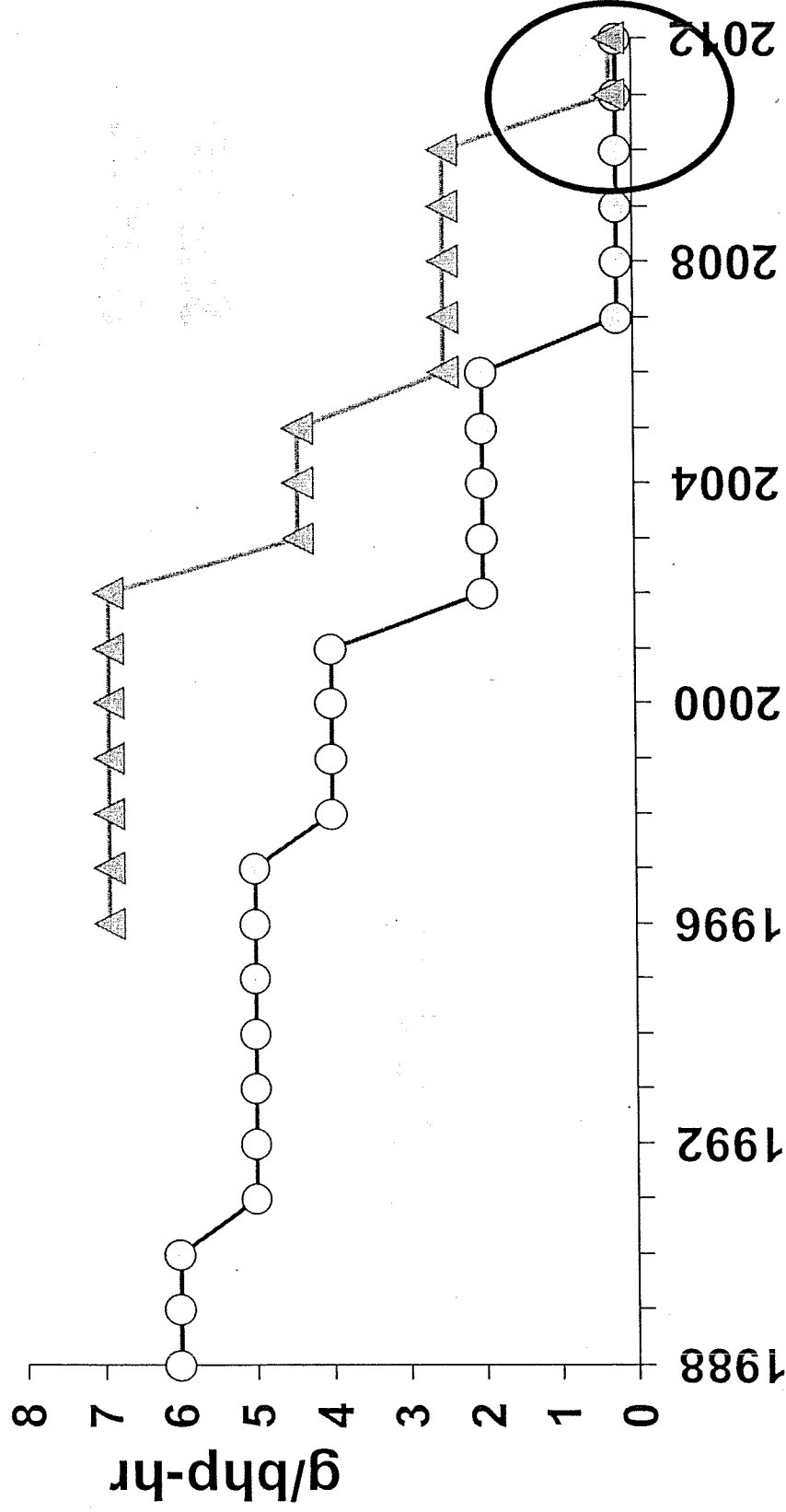
from: K. Eisbrenner, Excelerate Energy, Institute of Americas LNG 2005, February 2005.



# **LNG and Air Quality Issues**

# Off-road diesel $\text{NO}_x$ standards catching up to on-road standards

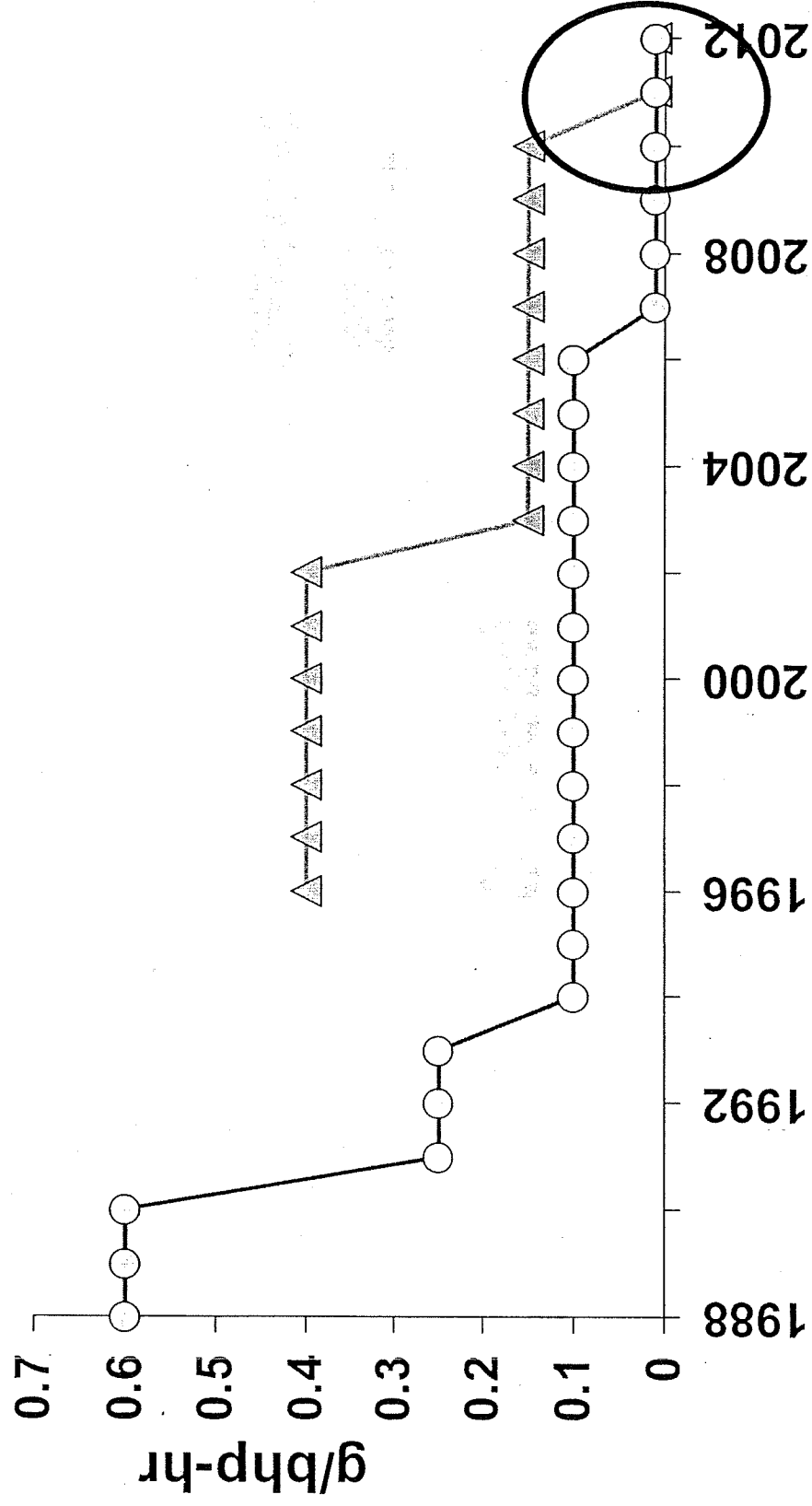
Dan Donohue, Chief, Emissions Assessment Branch, ARB, "Off-Road & Stationary Diesel Engine/Equipment Advancements: CARB's Perspective", Jan. 2004, CAPCOA Diesel Conf.





# Off-road diesel PM standards catching up to on-road standards

Dan Donohue, Chief, Emissions Assessment Branch, ARB, "Off-Road & Stationary Diesel Engine/Equipment Advancements: CARB's Perspective", Jan. 2004, CAPCOA Diesel Conf.



# **Will LNG terminal emissions be offset by use of LNG in vehicles?**

No. No difference in on-road heavy duty LNG and heavy duty diesel (HDD) vehicle  $\text{NO}_x$  and  $\text{PM}_{10}$  limits from 2007 onward. Use of on-road certified HDD engine is option for major POLB emitters - terminal tractors;

Nearly 100 on-road diesel engine terminal tractors are currently in use at POLB (at APM Terminal);

However, phase-in of LNG would not begin until 2009 model year at the earliest. On-road and off-road  $\text{NO}_x$  and  $\text{PM}_{10}$  heavy duty vehicle limits are same from 2011 onward.

# Conclusions

- LNG is not a necessity for California's economic vitality;
- Domestic gas is sufficiently abundant and cheaper to produce;
- No air quality benefits from using LNG vs. diesel in vehicles;
- Utility core natural gas contracts should not be made available to LNG importers to shift price risk to ratepayers;
- Function of LNG (if any) should be ancillary gas-on-gas spot market competition;
- Spot model puts all price risk on LNG shipper and protects utility ratepayers from long-term contract exposure.

